ALESHIN, Nikolay Ivanovich; DAVIDOVICH, Feliks Stanislavovich;
LACHKOV, G.M., inzh., retsenzent; CHERNIKOV, L.V.,
naychn. red.; GOLUBEVA, N.P., red.; ERASTOVA, N.V.,
tekhn. red.

[Loading devices for testing naval generators] Nagruzochnye
ustroistva dlia ispytaniia sudovykh generatorov. Lenin-
grad, Sudpromgiz, 1963. 82 p.   (MIRA 16:9)
    (Electric generators--Testing)
    (Ships—Electric equipment)

BRIGADNOV, P.; CHERNIKOV, M.; POPOV, A.

U.S.S.R. at international exhibitions and fairs. Vnesh. torg. 42
no.8:20-21 '62.   (MIRA 15:9)
        (Smyrna—Exhibitions) (Damascus—Exhibitions)
                (Leipzig—Exhibitions)

CHERNIKOV, M.N.

Agriculture - Study and Teaching

Teaching practice in courses on crops and livestock. Sov. agron. 10 no. 10, 1952.

9. Monthly List of Russian Accessions, Library of Congress, December 1952 1953. Unclassified.

CHERNIKOV, M.N., agronom.

Mustard buffer strips are an effective measure for snow retention.
Zemledelie 4 no.7:104-105 Jl '56.   (MLRA 9:9)
(Mustard) (Snow)

Enzymic hydrolysis of native and denatured crystalline horse-serum albumin. K. I. Strachitskii and M. P. Chernikov. *Biokhimiya* 12, 277–84(1947).—In common with many other proteins, horse-serum albumin resists enzymic hydrolysis in the native condition, but is easily hydrolyzed when denatured by heat. If urea is used as the denaturing agent, the horse-serum albumin is also the more easily decompd. by papain, with a consequent rise in the optical activity and viscosity of the protein solns. The denatured protein again becomes resistant to enzymic action if the urea is removed by dialysis. Solubilized heat-denatured horse-serum albumin resembles the native protein in resistance to trypsin hydrolysis, and in the increase of the optical activity and viscosity of the protein solns.

H. Priestley

CHERNIKOV, M. P.   PA 21T92

USSR/Medicine – Albumin   Jun/Aug 1947
    Medicine – Enzymes

"The accessibility, to Enzymatic Cleavage, of Native Denatured and Renatured Crystal-
line Albumin from Horse-Serum," K. I. Strachitskiy, M. P. Chernikov, Laboratory of
Tissue Proteins, Institute of Biological and Medicinal Chemistry, Academy of Medicinal
Scoences, 7 pp

"Biokhimiya" Vol XXI, No 4

Study of viscosity and optical activity changes due to denaturation. High concentrations
of urea facilitates the action of papain on albumin. Enzymatic digestibility, optical
activity and viscosity are restored to former values, by the removal of urea by dialysis
proper to native protein.

PA 21T92

PA 34/49107

CHERNIKOV, M. P.

USSR/Medicine - Biochemistry   Jul 49
        Medicine - Amino Acids

"Amino Acid Composition of Cowhide Procollagens,"
M. P. Chernikov, Inst of Biol and Med Chem, Acad Med
Sci USSR, 2½ pp

"Dok Ak Nauk SSSR" Vol LXVII, No 2

According to data cited, procollagen, obtained only
from fresh cowhides, is akin to collagen and gelatin
in amino-acid composition but is not identical, being
an individual, connective tissue albumin of the
collagen type. Submitted by Acad A. D. Speranskiy
5 May 49.

54/49T52

CHERNIKOV, M. P.

"Amino Acid Composition of the Soluble Proteins of the Skin." Thesis for degree of Cand. Biological Sci. Sub 19 Oct 50 Acad Med Sci USSR

Summary 71, 4 Sept 52. Dissertations Presented for Degrees in Sci. and Engineering in Moscow in 1950. From Vechernyaya Moskva. Jan-Dec 1950.

CHERNIKOV, M.P.

The Committee on Stalin Prizes (of the Council of Ministers USSR) in the fields of science and inventions announces that the following scientific works, popular scientific books, and textbooks have been submitted for competition for Stalin Prizes for the years 1952 and 1953. (Sovetskaya Kultura, Moscow, No. 22-40, 20 Feb - 3 Apr 1954)

Name	Title of Work	Nominated by
Chernikov, M. P.	"Procollagens, Their Chemical Composition, Properties, and Biological Role"	Institute of Biological and Medical Chemistry, Academy of Medical Sciences

SO: W-30604, 7 July 1954

CHERNIKOV, M.P.

USSR

The interaction between chymotrypsin and native and denatured proteins: M. P. Chernikov (Inst. Biol. and Med. Chem., Acad. Med. Sci. U.S.S.R., Moscow). *Biokhimiya* 20, 71–6(1955).—The electrophoretic mobility of chymotrypsin at pH 7.9 is considerably slower than that of native or denatured protein. This made possible the use of electrophoresis in the analysis of the interaction between proteinase and protein substrate. The enzyme-substrate complex is subject to reversible dissocn. according to the equation $E + S \rightleftharpoons ES \rightarrow E + P$, where E stands for enzyme, S for substrate, P for products of reaction. The ES complex should have an electrophoretic mobility equal to half that of $E + S$. With the aid of the electrophoretic app. it was shown that ES complexes are formed between chymotrypsin and serum and egg albumin. The avidity to ES complex formation for denatured proteins is nearly 100 times as great as that of the native proteins.   B. S. 4z.

Chernikov, M P

√The splitting of serum albumin by different quantities of chymotrypsin and the autolysis of chymotrypsin. M. P. Chernikov (Inst. Biol. and Med. Chem., Acad. Med. Sci. U.S.S.R., Moscow). *Biokhimiya* 20, 657-64(1955).— Crystalline dried and frozen α-chymotrypsin (I) prepd. by the method of Northrop, *et al.* (*Crystalline Enzymes*, 1948 (*C.A.* 42, 3794g)) was used as the enzyme. Recrystallized and dried horse serum albumin was employed as the substrate. Exptl. procedure was the same as described elsewhere (cf. *C.A.* 49, 10395h). A especially built glass chamber made possible close observation of the process of proteolysis from its early onset and enabled a more precise detn. of degrees of proteolysis at time intervals. Procedures are described at length for the study of the rate of I autolysis in relation to its concn. at 35° and at pH 7.9 and of the proteolytic activity of I during its autolysis, also of the proteolytic activity of I in relation to denatured horse serum albumin at 35° and at pH 7.9, and for the splitting (in %) of the native (II) and the denatured (III) serum albumins by I in relation to the activity of the enzyme-substrate ratio at 35° and pH 7.9; and the initial rate of splitting of II and of III by different concns. of I at 35° and pH 7.0. The rate of I autolysis at 35° and pH 7.9 depends upon the enzyme concn. Albumin substrate prevents I from losing its en-.

(OVER)

The splitting of ...

zymic activity. A study of the rate of proteolysis in relation to enzyme-substrate ratio disclosed a more complex relationship than might have been expected if it were assumed that the proteolytic reaction is of a monomolecular type. The initial rate of hydrolysis of native serum albumin by I increases as the ratio of enzyme to substrate rises from 1:1000 to 1:50. It decreases as the ratio is increased further from 1:50 to 1:1. For the successful splitting of III by I there appear to be 2 maxima of enzyme-substrate ratios, 1:5 and 1:50. There are 3 definite ratios at which the initial rate of proteolysis is lowest, 1:2, 1:10, and 1:100. The ratio between initial rate of splitting of II and III changes depending upon the enzyme-substrate ratio. A discussion of the probable mechanism of action of proteinase is presented which is capable of explaining all the facts observed in the study.   B. S. Levine

K. F. Shrianova, and M. P.
Referat Zh., Biol. Khim.
obtained from cattle crys
proteins were fractionated
resultant protein fractions
(NH₄)₂SO₄ satn. increased
content in the ppt. decre-
increased   At 0-8 satn.,
pure   Pure I was obtained
soln. by (NH₄)₂SO₄ up to
(b) the protein ppt. from
soln. was brought to pH
(NH₄)₂SO₄ at 0-3 satn
0-3 N H₃PO₄ to pH 5-9
protein ppt. resulting from
ly adding the latter to the
re ... and the salts b
... xtu e of denatured
... only one compone
... leads to the forma
... ons The great insta
... wards denaturing ag
ph retic analysis the ac
... work of the pr
... of it, I becomes
It is supposed that in a weak alkali
medium in the electric field
... H is decreased, and it
... (Russian)

the function
self-reproducing

does not form a complex   ...   conclusions are supported by
ref ...

CHERNIKOV, M.P.

The enzymic activity of [dialyzed, autolytic] decomposition products of trypsin, chymotrypsin, and pepsin. M. P. Chernikov (Inst. Biol. and Med. Chem., Acad. Med. Sci. U.S.S.R., Moscow). *Voprosy Med. Khim.* 2, No. 1, 59-68(1956); cf. *C.A.* 43, 6110b.—Trypsin, chymotrypsin, and pepsin solns. were placed in one chamber of a special cuvet divided in the middle by a cellophane membrane, and an albumin or gelatin protein substrate suspension was placed in the other chamber. After 2-4 hrs. at 0-35° the substrate suspension was removed, allowed to digest 3-21 hrs. at 35°, the unsplit protein pptd. by CCl₃CO₂H, and the aromatic amino acids and peptide fraction present were detd. spectrophotometrically at 280 mμ. A relative increase in optical density showed enzymic activity of the dialyzed products of autolysis of enzymes used.
Cyrus C. Sturgis, Jr.

Trypsin autolysis. M. P. Chernikov (Inst. Biol. Med. Chem., Acad. Med. Sci. U.S.S.R., Moscow). Biokhimiya 21, 295-306(1956); cf. C.A. 50, 10166.—The materials used consisted of cryst. trypsin and of twice crystd. egg albumin. All tests were performed in 1:15M phosphate buffer at pH 7.9 and at 35 ± 0.01°. The rate of trypsin autolysis remained practically unchanged within the limits of 0.1-1.0% at pH 7.9 and 35°. The enzyme stability increased as its concn. was gradually lowered from 0.1 to 0.002%. The enzyme activity of trypsin was lowered at a rate greater than its proportional loss in concn. due to the autolysis in 0.1% soln. of the enzyme. The stabilizing effect exerted upon trypsin by denatured albumin is 10 times as great as that effected by native albumin. In the process of hydrolysis of denatured albumin by trypsin (in 1:10 ratio) the stabilizing effect of the albumin retains its activity during the 1st 3 hrs. of the proteolysis. This was thought to be due to the fact that the peptides formed likewise possess stabilizing properties. In the process of trypsin autolysis at pH 7.9 and 35° its native form undergoes a process of splitting, creating end-products which pass through the cellophane membrane. Albumin substrate protects such products from losing their enzyme activity. B. S. L.

Chernikov, M.P.

USSR / General Biology. Physical and Chemical Biology   B-1

Abs Jour : Ref Zhur - Biol. No 1, 1958, No 203

Author   : Chernikov, M.P.

Inst   : Not Given

Title   : Some Questions Concerning the Theory of Proteinase Activity

Orig Pub : Uspekhi sovrem. biol., 1956, 42, No 4, 3-19

Abstract : This is a review of literature and the author's own data on
           the mechanism of action of proteolytic enzymes (I). The
           concept of the explosive character of proteolysis according
           to the principle of "all or nothing" is stated, to which
           the author opposes a gradual character for this process.
           The question of retardation of the hydrolysis of many varia-
           ties of protein when cleaved by I is clarified and this ac-
           tion is explained as a result of the competitive inhibition
           of I by the reaction products. The kinetics of proteolysis
           are traced and it is noted that an inhibitor of protein nature
           may be digested by I. The author concludes that proteolysis
Card   : 1/2

USSR / General Biology. Physical and Chemical Biology

B-1

Abs Jour : Ref Zhur - Biol., No 1, 1958, No 203

is the end reaction of a number of simple explosive reactions of individual qualitative peptid compounds and cannot be described by one known kinetic equation. I forms complexes primarily with the intermediate products of protein-substrate decomposition. The influence of external factors on the course of proteolytic reactions is noted. Bibl. 78 refs.

Card   : 2/2

CHERNIKOV, M.P.

Effect of denaturation and postdenaturation aggregation on the
rates of enzymic hydrolysis of proteins [with summary in English].
Vop.med.khim. 3 no.2:115-120 Mr-Ap '57.   (MIRA 10:7)

1. Institut biologicheskoy i meditsinskoy khimii AMN SSSR, Moskva.
        (PROTEINS, metab.
            enzymic hydrolysis, eff. of urea & heat denaturation
            caused aggregation on hydrolysis rate (Rus))
        (UREA, eff.
            on enzymic hydrolysis rate of proteins by causing
            aggregation of proteins (Rus))

CHERNIKOV, M.P., kandidat biologicheskikh nauk

Metabolism. Zdorov'e 3 no.6:3-5 Je '57.   (MIRA 10:7)
    (METABOLISM)

CHERNIKOV, M.P.

Splitting of native serum albumin by trypsin, chymotrypsin, carboxypeptidase, and their mixtures [with summary in English] Biokhimiia 22 no.1/2:5-13 Ja-F '57.   (MIRA 10:7)

1. Institut biologicheskoy i meditsinskoy khimii Akademii meditsinskikh nauk SSSR, Moskva.
       (SERUM ALBUMIN,
           splitting with trypsin, chymotrypsin, carboxypeptidase &
           their mixture (Rus))
       (TRYPSIN, effects,
           serum albumin splitting, alone & with chymotrypsin &
           carboxypeptidase (Rus))
       (PROTEASES, effects,
           chymotrypsin, serum albumin splitting, alone & with
           trypsin & carboxypeptidase (Rus))

CHERNIKOV, M.P.

Enzymatic hudrolysis of globular proteins [with summary in English]
Biokhimiia 23 no.2:325-334 Mr-Ap '58   (MIRA 11:6)

1. Institut biologicheskoy i meditsinskoy khimii AMN SSSR, Moskva.
        (PROTEINS; metabolism
            enzymatic hydrolysis of globular proteins (Rus))

OREKHOVICH, V.N.; KHOKHLOVA, O.S.; CHERNIKOV, M.P.

Fixation of proteinases by wool. Biokhimiia 24 no.2:353-356 Mr-Ap '59

(MIRA 12:7)

1. Institute of Biological and Medical Chemistry, Academy of Medical Sciences of the U.S.S.R., Moscow.

(PROTEASE
        binding by animal hair (Rus))
(HAIR,
        binding of proteases by animal hair (Rus))

CHERNIKOV, M. P., Doc Bio Sci, "PROTEINASES AND THE ME-
CHANISM OF THEIR ACTION." MOSCOW, 1960. (ACAD MED SCI
USSR). (KL, 3-61, 209).

122

CHERNIKOV, M. P., YEVTIKHINA, Z. F., KUNINA, O. V., LEVYANT, M. I., OREKHOVICH, V. N., FIRFAROVA, K. F., KHOKHLOVA, O. S. (USSR).

Tissue Proteinases in Spleen, Kidneys, Liver, Brain and Certain Forms of Transplanted Tumours.

report presented at the 5th Int'l.
Biochemistry Congress, Moscow, 10-16 Aug. 1961

CHERNIKOV, M.P.

Ability of pepsin to hydrolyze denatured egg albumin. Vop.
med. khim. 9 no.2:125-127 Mr-Ap '63.   (MIRA 17:8)

1. Institut pitaniya AMN SSSR, Moskva.

CHERNIKOV, M.P.; YERMOLAYEV, M.V.

Hydrolysis of egg albumin with pepsin and the effect of thermal
protein denaturation, acid medium and the addition of plant oil
and carbohydrates on this process. Vop. pit. 23 no.2:31-35 Mr-
Ap '64.   (MIRA 17:10)

1. Laboratoriya biokhimii pitaniya Instituta AMN SSSR, Moskva.

KOMAROVA, L.V.; CHERNIKOV, M.P.

Enzymatic hydrolysis of serum albumin modified by p,
p'-difluor-m, m'-dinitrodiphenyl sulfone. Ukr. biokhim.
zhur. 36 no. 4:521-526 '64.   (MIRA 18:12)

1. Yaroslavskiy meditsinskiy institut i Institut pitaniya
AMN SSSR, Moskva. Submitted Sept. 26, 1963.

CHERNIKOV, M.P.; YEVTIKHINA, Z.F. (Moskva)

Proteinases in animal tissues. Usp. sovr.biol. 57 no.1:50-70 Ja-
F '64.

(MIRA 17:5)

CHERNIKOV, N.A.

AID P - 669

Subject   : USSR/Engineering

Card 1/1   Pub. 29 - 4/24

Authors   : Poplavskiy, D. P., Eng. and Chernikov, N. A., Eng.

Title   : Furnace with rotating grate bars

Periodical   : Energetik,   7,   9-10,   Jl 1954

Abstract   : General description of construction and operation of the
                rotating grates for the B & W boiler types designed by
                the engineers Barta and Levin. One drawing.

Institution : None

Submitted   : No date

TATISHCHEV, S.V., prof.; CHERNIKOV, N.A., inzh.

Operational characteristics of stokers with reciprocating distributors burning run-of-the-mine anthracite. Tekst. prom. 18 no.9:47-49 S '58. (MIRA 11:10)

1. Moskovskiy torfyanoy institut (for Tatishchev). 2. Energo-legprom (for Chernikov).
(Furnaces)

TATISHCHEV, S.V., prof.; CHERNIKOV, N.A., inzh.

Using "run-of-mine" anthracite in hearths with rabbling baffle plates.
Tekst.prom. 18 no.12:42-46 D '58.   (MIRA 11:12)

1. Moskovskiy tekstil'nyy institut (for Tatishchev). 2. Energolegprom
(for Chernikov).   (Textile factories--Heating and ventilation)

PA - 2702

AUTHOR   CHERNIKOV N.A.
TITLE   The influence of a Longitudinal Magnetic Field exercised on
            the Multiple Scattering of Particles. (Vliyaniy prodol'nogo
            magnitnogo polya na mnogokratnoye rasseyaniye chastits.-
            Russian)

ABSTRACT   The influence of a Longitudinal Magnetic Field exercised
            on the Multiple Scattering of Particles.
            A homogeneous magnetic field may be assumed to exist in
            the scattering magnetic field. The present work investigates
            the scattering of an infinitely thin bundle of relativi-
            stic particles (which are parallel to the vector of
            magnetic induction). As is known, the magnetic field
            does not change the energy of the particles. If energy
            losses by scattering are neglected, it will be sufficient
            if only the case that all particles have the same energy
            is dealt with. As z-axis the axis of the bundle is
            selected. The properties of the medium must not depend
            on x and y and the angle between the velocities of the
            particles and the z-axis is assumed to be small on the

CARD 1/3

PA - 2702

The influence of a Longitudinal Magnetic Field exercised
on the Multiple Scattering of Particles.

average. The flow of the particles is assumed to proceed
from the origin of the coordinates. With $z > 0$ the
equation of the processes examined has the following
form:

$$(\delta n/\delta z) + \alpha (\delta n/\delta x) + \beta (\delta n/\delta y) +$$

$$+ L(\beta\delta n/\delta\alpha - \alpha\delta n/\delta\beta) + n/l (z) = \alpha^2 (z) \left[\delta^2 n/\delta\alpha^2 + \delta n/\delta\beta^2 \right] /4.$$

The corresponding boundary condition is:

$n = A\delta(x)\delta(y)\delta(\alpha)\delta(\beta)$ at $z = 0$. Here α and β denote
the projections of the angular deviation of the velocity
of the particle from the z-axis onto the zx- and the zy-
plane; n - the function of the distribution of the
particles with respect to x, y, z, α, β; A - the relation of
the particle flow through the plane $z = 0$ to the velocity
of the particle, $1/l(z) = (m/Tp) + \sum_i N_i(z)\sigma_i$; $N_i(z)$ -

the number of atoms of the type i in the volume unit of
the medium; σ_i - the cross section of the absorption of

CARD 2/3

The influence of a Longitudinal Magnetic Field PA - 2702
exercised on the Multiple Scattering of Particles.

particles by atoms of the type i; m - rest mass,
p - momentum; T - life of the particles with respect
to a spontaneous decay. This equation is solved by means
of a Fourier development. In conclusion two effects are
mentioned which are caused by the magnetic field in the
weak bundle: the main effect consists in the fact that,
with otherwise equal conditions, the bundle is narrower.
The second effect consist in the fact that the
"polarization axis" is turned by a certain angle.
(No Illustrations)

ASSOCIATION: United Institute for Nuclear Research.
PRESENTED BY: -
SUBMITTED: -
AVAILABLE: Library of Congress.

CARD 3/3

CHERNIKOV, N. A.

56-2-38/47

AUTHOR   Chernikov, N.A.

TITLE   ·A Comment on the Elastic Scattering of Relativistic
Particles in Matter in the Steady Case.
(Zamechaniye ob uprugom rasseyanii relyativistskikh chastits
v veshchestve v statsionarnom sluchaye)

ABSTRACT   A steady flow of particles of a certain kind α with
positive rest masses is assumed to be scattered in
matter only by elastic collisions. These particles are
assumed to be unstable, but they are also to be absorbed
in matter. The particles of matter are assumed to be at
rest. Under these conditions the kinetic equation for
the motion of the flow of particles in matter (in the
system of reference connected with matter) has the same
shape as the nonrelativistic kinetic equation:

$$\vec{v}\,\nabla\Psi + (\partial/\partial\vec{v})(\vec{\eta}\,\Psi) + v\Psi/\ell = \int \Psi^* v^* \sum_i \varrho_i h_i(v^*, v)\delta$$

$$(\cos\theta_o - \mu_i)d\vec{v}^* + q_i\,\Psi^* = \Psi(\vec{r}, v^*), \vec{v} = (2E/p^2)\vec{p}$$

CARD 1/2

56-2-38/47

A Comment on the Elastic Scattering of Relativistic Particles in Matter in the Steady Case.

Also for the motion of the particles between these collisions an equation is given. In conclusion a relation for the isotropic scattering in the center of mass system is written down.
There are no figures.

ASSOCIATION: United Institute for Nuclear Research.
                 (Ob^"yedinennyy institut yadernykh issledovaniy.)
SUBMITTED: May 17, 1957.
AVAILABLE: Library of Congress.

CARD 2/2

Chernikov, N.A.

PA - 2335

AUTHOR: CHERNIKOV,N.A.

TITLE: A Generalized Problem on the Stokhastic Motion of a Particle.
(Obobshchennaya zadacha o stokhaticheskom dvizhenii chastitsy,
Russian).

PERIODICAL: Doklady Akademii Nauk SSSR, 1957, Vol 112, Nr 6, pp 1030 - 1032,
(U.S.S.R.)
Received: 4 / 1957   Reviewed: 5 / 1957

ABSTRACT: The usual formulation of the problem of the stochastic motion
of a particle in which the time t plays an important part, is
little suited for the theory of relativity and especially not
for the theory of gravity. The natural generalization of the
ordinary problem suggested here eliminates this deficiency and
gives a canonical formulation of the problem which is analogous
to the problem of the probability of a collision between two
particles. As "state of the material point" the totality of its
space-time position and velocity is described (contrary to the
usual practice). The space F of the states of the material point
be assumed to be a simple differentiable manifold. This applies
for instance if the space of the occurences is galilean. The space
F has 7 dimensions. However, everywhere, where this space is
finite, the author denotes it by n in consideration of possible
generalizations. The motion of the material point in an exterior
field of force is described by the system of equations

Card 1/2

PA - 2335

A Generalized Problem on the Stochastic Motion of a Particle.

$dx_i/d\tau = F_i(x_1,\ldots,x_n)$ with $i = 1,2,\ldots,n$. Here $x_1,\ldots,x_n$ denote the coordinates in F. The totality of the functions $\{f_1(x_1,\ldots,x_n),\ldots,f_n(x_1,\ldots,x_n)\}$ in F forms a vectorial field $f(P)$, $P \leftarrow F$. The total manifold of the possible motions of the material point in the case of an assumed field $f(P)$ is represented by a family of vectorial lines of this field. The mechanical problem here is the following: Assumed are the field $f(P)$ and the initial state P_0 of the material point; after elapse of the eigen-time τ its state $P = \varphi(\tau;P_0)$ is to be sought.
The author investigates a certain motion of the particle. The particle is created in a certain state $P_1 \in F$ and, after the period of existence $\tau > 0$ it "survives" the totality of the states $P = \varphi(\eta;P_1)$ $0 < \eta < \tau$. The particle then decays in the state $P_2 = \varphi(\tau;P_1)$. This totality of states is here called "life curve" of the particle. These ideas are then carried out mathematiclly.

ASSOCIATION: Laboratory for Theoretical Physics of the United Institute for Nuclear Research.
PRESENTED BY: Member of the Academy V.A.FOK.
SUBMITTED: 13.10.1956.
AVAILABLE: Library of Congress.
Card 2/2

20-114-3-22/60

AUTHOR: Chernikov, N. A.

TITLE: The Relativistic Integral of Collision (Relativistskiy integral stolknoveniy)

ABSTRACT: A certain particle α incides upon a generally inhomogeneous medium with variable density. The particles contained in this medium move with different velocities. Only the paired collisions of particle α with the particles of the medium play a part here, and the external forces shall have no influence upon the collisions. All particles are here considered as relativistic and the space of the events as Galilean. The present paper determines the probability $T^{-1}(P_o)d\tau$ of the fact that particle α after the interval $d\tau$ of the proper time collides with any particle of the medium. Apparently

$$T^{-1}(P_o) = \sum_\beta T^{-1}_{\alpha\beta}(P_o)$$ applies, where $T^{-1}_{\alpha\beta}(P_o)$ denotes the corresponding probability of the collision of particle α with

Card 1/3

20-114-7-22/60

The Relativistic Integral of Collision

a particle β contained in the medium. At first the author calculates $T^{-1}_{\alpha\beta}(P_o)$ for the case of pre-relativistic mechanics and the expression found is explicitly given. Under certain circumstances this expression can be simplified and then $T^{-1}_{\alpha\beta}$ can also be determined for the case of relativistic mechanics. For this purpose only a certain hemisphere has to be replaced by a two-dimensional plane in the space of the events. The duration of the interaction of particles α and β is assumed to be small. The expression

$$\int_{-\infty}^{+\infty} A(P^*)L(P;a^*)da^* - A(P)T^{-1}(P)$$ is found for the relativistic Boltzmannian integral of collision in which the collisions of particle α with the particles of matter are taken into consideration. The formulae valid for the function $L(P,a^*)$ are also explicitly given. There is 1 reference, which is Slavic.

Card 2/3

20-114-3-22/60

The Relativistic Integral of Collision

ASSOCIATION: United Institute for Nuclear Research (Ob" yedinennyy institut
              yadernykh issledovaniy)

PRESENTED: January 14, 1957, by V. A. Fok, Member of the Academy

SUBMITTED: January 6, 1957

Card 3/3

CHERNIKOV, N.A., Cand Phys-Math Sci -- (diss) " Stochastic
movement of a relativistic particle." Len,1958. 8 pp.
(Len Order of Lenin State U im A.A. Zhdanov.) 100 copies.
(KL, 12-58, 96)

-16-

16(1), 24(5)   SOV/155-58-2-34/47
AUTHOR: Chernikov,N.A.

TITLE: Decomposition of the Particle and Connection of Particles in the
             Termini of the Momentum Space (Raspad chastitsy i soyedineniye
             chastits v obrazakh prostranstva skorostey)

PERIODICAL: Nauchnyye doklady vysshey shkoly. Fiziko-matematicheskiye nauki,
             1958, Nr 2, pp 158-161 (USSR)

ABSTRACT: The author uses geometric and algebraic notions and ideas in
             order to obtain a geometric interpretation of the "kinematics" of
             nuclear reactions. Thus, extended analytic calculations combined
             with the transition from one reference system to another, are
             replaced by simple formulas of the hyperbolic trigonometry. The
             author obtains interesting absolute interpretations. Let a
             particle move with the velocity a in a reference system which
             moves with the velocity ρ. Then the modulus of the three-dimensional
             impulse of the particle is $P_{oa} = m \rho \, sh \frac{oa}{c}$, where m is the
             resting mass, c is the velocity of the light, $\overline{oa}$ is the distance
             of the points o and a in the momentum space. The kinetic energy
             $\mathcal{E}_{oa}$ of the particle in the system o is $\mathcal{E}_{oa} = m c^2 \left[\frac{oa}{c} - 1 \right]$. Then

Card 1/2

Decomposition of the Particle and Connection of   SOV/155-58-2-34/47
Particles in the Termini of the Momentum Space

the ratio $\dfrac{\varepsilon_{oa}}{m}$ is the area divided by 2π of a circle of
radius oa in the momentum space. Some further similar assertions
are given.
There are 4 Soviet references.

ASSOCIATION: Ob"yedinennyy institut yadernykh issledovaniy (United Institute
for Nuclear Research)

SUBMITTED: January 10, 1958

Card 2/2

~~21(1)~~ 24.6000

SOV/155-58-4-21/34

AUTHORS: Maykov, Ye.V. and Chernikov, N.A.

TITLE: On a Graphic Method in the Kinematics of the Collision of two Particles (Ob odnom graficheskom metode v kinematike stolknoveniya dvukh chastits)

PERIODICAL: Nauchnyye doklady vysshey shkoly. Fiziko-matematicheskiye nauki, 1958, Nr 4, pp 129 - 134 (USSR)

ABSTRACT: Let m_{-1}, m_{-2} and a_{-1}, a_{-2} be the rest masses and velocities of the particles γ_{-1}, γ_{-2} before the collision. Let m_1, m_2 and a_1, a_2 be the rest masses and velocities of the corresponding particles γ_1, γ_2 after the collision. The collision γ_{-1}, $\gamma_{-2} \rightarrow \gamma_1$, γ_2 is considered according to the scheme γ_{-1}, $\gamma_{-2} \rightarrow \gamma_0 \rightarrow \gamma_1$, γ_2. At first in the velocity space (a Lobachevskiy space) m_0 and a_0 are determined from γ_0. The interval $a_1 a_2$ contains a_0; let $\theta_1 = a_0 a_1$, $\theta_2 = a_0 a_2$. The geometric position of the possible positions of a_1 (and a_2

Card 1/3

On a Graphic Method in the Kinematics of the   SOV/155-58-4-21/34
Collision of two Particles

respectively) is a sphere σ_1 (and σ_2 respectively) with the radius ϱ_1 (and ϱ_2 respectively) and the center a_o. In a similar way $w = \frac{E}{p}$ (the ratio of the kinetic energy of the particle to its impulse) can be graphically determined as the length of a certain circular secant. For the determination of the circular radius and of some other initial data for the construction the values of the functions

$$\varphi(x,y) = \sqrt{\frac{(1-x)^2 - y^2}{(1+x)^2 - y^2}} \quad \text{in} \quad x \geqslant 0 , \quad y \geqslant 0 , \quad x + y \leqslant 1 \quad \text{and}$$

$$F(u,v) = \frac{u(1- v^2)}{1- u^2 v^2} \quad \text{in} \quad 0 \leqslant u \leqslant 1 , \quad 0 \leqslant v \leqslant 1$$

are needed. Corresponding tables of values are set up in the

Card 2/3

On a Graphic: Method in the Kinematics of the   SOV/155-58-4-21/34
Collision of two Particles
                Laboratory for Theoretical Physica of the United Institute for
                Nuclear Research.
                There are 5 references, 4 of which are Soviet, and 1 Dutch.

ASSOCIATION: Ob"yedinennyy institut yadernykh issledovaniy (United
             Institute for Nuclear Research)

SUBMITTED: June 22, 1958

Card 3/3

21

21(1)
AUTHORS: Logunov, A.A., Tavkhelidze, A.N.,   SOV/155-58-5-21/37
                  Chernikov, N.A.

TITLE: On the Question of the Dispersion Relations for Reactions
                  With Variable Number of Particles

PERIODICAL: Nauchnyye doklady vysshey shkoly. Fiziko-matematicheskiye
                  nauki,1958,Nr 5,pp 120-123 (USSR)

ABSTRACT: In /¯Ref 1_7 Logunov set up dispersion relations for processes
                  with variable number of particles. In /¯Ref 2,3_7 the analytic
                  properties of the amplitude were treated. The authors use the
                  results from /¯Ref 1,2,3_7 in order to give in the present
                  paper for reactions of the double Compton effect a further
                  extension of those dispersion cases for which the dispersion
                  relations do not contain the nonobservable energy range.
                  § 1 Kinematics of the process § 2 Dispersion relations.
                  The authors thank N.N. Bogolyubov, Academician for discussion.
                  There are 1 figure, and 3 Soviet references.

ASSOCIATION: Ob"yedinennyy institut yadernykh issledovaniy (United
                  Institute for Nuclear Research)

SUBMITTED: March 26, 1958

Card 1/1

21(1), 24(5), 24(7)   SOV/155-59-1-26/30

AUTHOR: Chernikov, N.A.

TITLE: A General Form of the Kinetic Equation of Boltzmann

PERIODICAL: Nauchnyye doklady vysshey shkoly. Fiziko-matematicheskiye nauki,
               1959, Nr 1, pp 168-172 (USSR)

ABSTRACT: The kinetic equation of Boltzmann is established in a form
               which retains its validity in the non-relativistic theory as
               well as in the relativistic theory. In the latter case it
               holds for particles with a positive rest mass as well as for
               particles the rest mass of which equals zero. The gravitation
               is not considered. The derivation of the mentioned equation
               bases on earlier investigations of the author /Ref 1,2_7.

               There are 2 Soviet references.

ASSOCIATION: Ob"yedinennyy institut yadernykh issledovaniy (Joint Institute
               of Nuclear Research)

SUBMITTED: December 26, 1958

Card 1/1

CHERNIKOV, N.A.

Possible method for determining the distribution density of
pulse probabilities of a particle from an experiment on dis-
persion. Nauch.dokl.vys.shkoly; fiz.-mat.nauki no.3:151-157
'59. (MIRA 13:6)

1. Ob"yedinennyy institut yadernykh issledovaniy.
(Particles, Elementary)

67253

24.4500

24 (7)

AUTHORS: Tavkhelidze, A. N., Todorov, I. T.,   SOV/20-129-4-15/68
            Chernikov, N. A.

TITLE: The Spectral Properties of the Green Function in a Model of
            the Meson Field With a Fixed Source

PERIODICAL: Doklady Akademii nauk SSSR, 1959, Vol 129, Nr 4, pp 769 - 772
            (USSR)

ABSTRACT: First, attention is briefly directed towards various models of
            the quantum field theory. If in Chew's model (Ref 3) the nucleon
            spin is not taken into account, and if meson energy is assumed
            not to depend on the momentum, the investigation of this model
            is reduced to the solution of a system of two ordinary differ-
            ential equations of second order. In the present article the
            properties of the Green function in such a simplified model are
            investigated. It is shown that, in the case of a rigorous treat-
            ment of the problem, no paradoxa of the type of "negative pro-
            babilities" occur. The Hamiltonian of the boson field with a
            fixed fermion source has the following form in the charge-sym-
            metric theory:

Card 1/4

67253

The Spectral Properties of the Green Function in a   SOV/20-129-4-15/68
Model of the Meson Field With a Fixed Source

$$\mathcal{H} = M(\psi_p^+ \psi_p + \psi_n^+ \psi_n) + \sum_k \omega_k (A_k^+ A_k + B_k^+ B_k + C_k^+ C_k) -$$
$$- g_0 \sum_k R_k \left\{ (A_k + B_k^+) \psi_p^+ \psi_n + (A_k^+ + B_k) \psi_n^+ \psi_p + \frac{1}{\sqrt{2}} (C_k + C_k^+)(\psi_p^+ \psi_p - \right.$$
$$\left. - \psi_n^+ \psi_n \right\}.$$ Here A_k, B_k, and C_k (A_k^+, B_k^+, and C_k^+) denote the anni-
hilation operators (production operators) of the positive,
negative, and neutral mesons; ψ_p and ψ_n (ψ_p^+ and ψ_n^+) – the anni-
hilation operators (production operators) of the nucleons;
$\sqrt{2\omega_k} R_k$ – the form factor of the nucleons. The proton propaga-
tor may be written down in the form $S(t-t') =$
$$= i \langle 0 | T(\psi_{Hp}(t) \psi_{Hp}^+(t')) | 0 \rangle,$$ where $\psi_{Hp}(t)$ is an operator in
Heisenberg representation: $i \dfrac{d\psi_{Hp}(t)}{dt} = \psi_{Hp}(t)\mathcal{H} - \mathcal{H}\psi_{Hp}(t), \psi_{Hp}(0) =$
$= \psi_p$. The proton propagator may be written down in form of a
scalar product. The operator of the nucleon number $\psi_p^+ \psi_p + \psi_n^+ \psi_n$

Card 2/4

67253

The Spectral Properties of the Green Function in a   SOV/20-129-4-15/68
Model of the Meson Field With a Fixed Source

has four linearly independent eigenfunctions; two vacuum func-
tions, one one-nucleon function and one two-nucleon function.
Green's function of the proton satisfies the equation

$(E - \mathcal{H})g(E) = \bar{\phi}_0$, where $\bar{\phi}_0 = \psi_p^+ \mid 0 \rangle$ is the amplitude of state
with a mathematical proton. $\phi(t)$ is a solution of the modified

Schroedinger equation $i \frac{\partial \bar{\phi}}{\partial t} = \mathcal{H}\bar{\phi} + \bar{\phi}_0 \delta(t)$ with the condition

$\phi(t) = 0$, where $t < 0$. The authors then go over by means of an
orthogonal transformation to a new basis. The same transforma-
tion also occurs in the space spanned by the operators B_k and C_k.

The Hamiltonian just mentioned is then written down also in the

new basis. In this case $(E - H)G(E) = \bar{\phi}_0 \begin{pmatrix} 1 \\ 0 \\ 0 \end{pmatrix}$ is obtained, where $\bar{\phi}_0$

denotes the vacuum Hamiltonian a+a + b+b + c+c. The authors then
go over in this equation to the Schroedinger variables. The homo-
geneous equation corresponding to the equation thus resulting
is the equation of motion of a particle with spin 1/2 in a
Card 3/4   spherically-symmetric potential field and in a spherically-

The Spectral Properties of the Green Function in a   672 3
Model of the Meson Field With a Fixed Source   SOV/20-129-4-15/68

symmetric magnetic field. The eigenvalue spectrum λ_n of the
corresponding operator L is discrete. The amount of the eigen-
values E_n is limited towards lower values. Also if the neutral
mesons are not considered the same result is obtained. It is
further said that the authors thank Academician N. N. Bogolyubov
for his interest in the present investigation and for his useful
advice, and A. A. Logunov and D. V. Shirkov for useful discus-
sions. There are 7 references, 2 of which are Soviet.

ASSOCIATION: Ob"yedinennyy institut yadernykh issledovaniy (Joint Institute
of Nuclear Research)

PRESENTED: June 29, 1959, by N. N. Bogolyubov, Academician

SUBMITTED: June 6, 1959

Card 4/4

S/020/60/133/01/23/070
B014/B011

AUTHOR: Chernikov, N. A.

TITLE: Reduction of the Relativistic Integral of Collisions to the
            Boltzmann Form

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 133, No. 1,
            pp. 84-87

TEXT: In previous papers (Refs. 1, 2), the author had derived expressions
for the relativistic collision integral. In the present paper, they are
given for the case of elastic collision in the Boltzmann form. It is there-
by shown that the integral of the collision of particles, distributed ac-
cording to the relativistic Maxwell law, is equal to zero. The author first
investigates the collision of two types of particles and then gives,
with (3), the relativistic integral of the collision between particles of
the one type and particles of the second type. In a bulky expansion, this
integral is transformed into the Boltzmann form (18). (21) gives the
conditions as to when the integral (18) vanishes. These conditions (21)
are transformed into the form (22). (22) is found to be the generalized

Card 1/2

Reduction of the Relativistic Integral of   S/020/60/133/01/23/070
Collisions to the Boltzmann Form   B014/B011

law of local Maxwell distribution in the relativistic case. There are
3 Soviet references.

ASSOCIATION: Ob"yedinennyy institut yadernykh issledovaniy
              (Joint Institute of Nuclear Research)

PRESENTED: March 14, 1960, by V. A. Fok, Academician

SUBMITTED: February 27, 1960

Card 2/2

CHERNIKOV, N. A.

S/020/60/133/02/22/068
B019/B060

AUTHOR: Chernikov, N. A.

TITLE: The Relativistic Kinetic Equation and the State of
            Equilibrium of a Gas in a Static Gravitational Field γ
            Having Spherical Symmetry

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 133, No. 2,
            pp. 333-336

TEXT: The kinetic equation is derived for particles being in a static
gravitational field with spherical symmetry. The author refers in this
connection to his own previous papers (Refs. 1, 2, 3, 4). The conclusions
reached here hold for particles with a mass at rest equating zero.
Furthermore, a solution is found for the kinetic equation, which
corresponds to the state of equilibrium of the gas in the same field.
The equations of motion of the particles are given by (3), and formula
(9) is derived for the kinetic equation in a bulky statistical analysis.
By utilizing results from an earlier paper (Ref. 3) the kinetic equation

Card 1/2

The Relativistic Kinetic Equation and the
State of Equilibrium of a Gas in a Static
Gravitational Field Having Spherical Symmetry

S/020/60/133/02/22/068
B019/B060

(10) is then obtained for the motion of particles in a substance in the
presence of a gravitational field. The distribution function cor-
responding to the state of equilibrium of the gas in the field is given
by (14), and, as the author showed in a previous paper (Ref. 4), the
collision integral for this function is equal to zero. In this case,
the kinetic equation thus assumes the form of (15). There are 4 Soviet
references.

ASSOCIATION: Ob"yedinennyy institut yadernykh issledovaniy (Joint
               Institute of Nuclear Research)

PRESENTED: March 14, 1960, by V. A. Fok, Academician

SUBMITTED: February 27, 1960

/C

Card 2/2

89016

S/020/60/135/004/009/037
B019/B077

$\mathcal{24.4500}$ (1160, 1345, 1538)

AUTHOR: Logunov, A. A., Tavkhelidze, A. N., Torodov, I. T., and Chernikov, N. A.

TITLE: Majorization of Feynman Graphs

PERIODICAL: Doklady Akademii nauk SSSR, 1960, Vol. 135, No. 4, pp. 801 - 804

TEXT: The authors present the results of a further development of the idea of the majorization of Feynman graphs as suggested by Nambu and Symanzik (Refs. 1, 2). Every Feynman graph D represents a quadratic form $\mathcal{Q}_D$ of the external momenta p_a. On the condition that the law of conservation holds for the four-momenta k in the inner lines of the graph k, are linear functions of p_a and of the independent inner momenta t_i. If the following relation is valid for $K_D(\varkappa, p, t)$:

Card 1/4

89016

Majorization of Feynman Graphs

S/020/60/135/004/009/037
B019/B077

$$K_D(\gamma, p, t) = \frac{1}{2}\sum_{\nu=1} \alpha_\gamma(k_\nu^2 - m_\gamma^2) = \sum_{i,j} a_{ij}t_i t_j - 2\sum_i b_i t_i + c \qquad (1),$$

where I is the number of inner lines of the graph, then the quadratic form
can be determined from:

$$Q_D(\alpha, p) = \frac{\begin{vmatrix} a_{ij} & b_i \\ b_i & c \end{vmatrix}}{|a_{ij}|} \qquad (2)$$

On the basis of known results, the following lemma and two more theorems
are proved: lemma: the quadratic form Q_D is equal to the least value of
the quadratic form K_D if the vectors k_γ fulfill the law of conservation
of momentum in every unit of the graph, and if they assume a value from

Card 2/4

89016

Majorization of Feynman Graphs   S/020/60/135/004/009/037
                                    B019/B077

the quantity P of all vectors of the type $p = \sum_a A_a p_a$ (A_a are real numbers).
Theorem 1 reads as follows: Any graph can be majorized by any of its sub-
graphs. Theorem 2 reads as follows: If a graph D contains a polygon of
(n+1) sides which has the mass M on n sides and the mass $m \leq M$ on one side,
a new graph D' will be obtained if the change of mass is of the forms
$M \to m$ and $m \to M$ with

$$G(D') \subseteq G(D).$$

As an example the authors investigated the amount R of all graphs with
a strong coupling in the pion-nucleon part. In every intersection of this
graph only three lines do combine: 2 or 0 baryon lines, and 1 or 3 meson
lines. It is shown that any graph of the sub-part R** can be majorized
by one of the two diagrams shown in Fig. 2. R** is that sub-part of R
where a nucleon polygon and pion lines appear in its graphs, and where
the external points a and b are characteristic points. N. N. Bogolyubov
is thanked for a valuable discussion. There are 2 figures and 5 refer-
ences: 1 Soviet, 3 US, and 1 Italian.

Card 3/4

89016

Majorization of Feynman Graphs   S/020/60/135/004/009/037
                                        B019/B077

ASSOCIATION: Ob"yedinennyy institut yadernykh issledovaniy (Joint
                Institute of Nuclear Research)

PRESENTED: June 21, 1960, by N. N. Bogolyubov, Academician
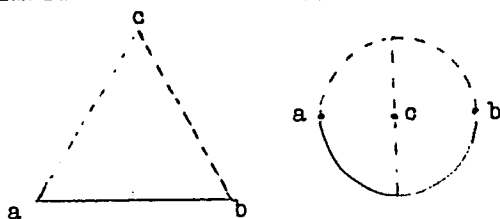
SUBMITTED: June 7, 1960

Fig. 2

Card 4/4

LOGUNOV, A.A.; TODOROV, I.T.; CHERNIKOV, N.A.

Surface of singular points in the Feyman diagram. Godishnik
fiz mat 55 no.2:117-137 '60/'61 [publ. '62].

CHERNIKOV, N.A.

[Relativistic gas in a gravitational field]Reliativistskii
gaz v gravitatsionnom pole. Dubna, Ob"edinennyi in-t
iadernykh issl., 1962. 22 p.   (MIRA 15:10)
  (Gases, Kinetic theory of) (Gravitation)

CHERNIKOV, N.A.

LOGUNOV, A. A., TODOROV, I. T. and CHERNIKOV, N. A.

"Analytical Properties of the Feynman Graphs"

report presented at the Intl. Conference on High Energy Physics, Geneva,
4-11 July 1962

Joint Institute for Nuclear Research
Laboratory of Theoretical Physics, Dubna, 1962

LOGUNOV, A.A.; TODOROV, I.T.; CHERNIKOV, N.A.; SARANTSEVA, V.R.,
      tekhn. red.

      [Surface of singular points of a Feynman diagram] Poverkhnost'
      osobykh tochek diagrammy Feinmana. Dubna, Ob"edinennyi in-t
      iadernykh issl., 1962. 29 p.   (MIRA 15:3)
               (Quantum electrodynamics)

CHERNIKOV, N. A.

"Higher Antisymmetrical Statistics"

report presented at the Intl. Conference on High Energy Physics, Geneva, 4-11 July 1962

Joint Institute for Nuclear Research, Laboratory of Theoretical Physics

LOGUNOV, A.A.; LYU I-CHEN'; TODOROV, I.T.; CHERNIKOV, N.A.;
SARANTSEVA, V.R., tekhn. red.

[Dispersion relations and analytic properties of partial
amplitudes in the perturbation theory]Dispersionnye sootno-
sheniia i analiticheskie svoistva partsial'nykh amplitud v
teorii vozmushchenii. Dubna, Ob"edinennyi in-t iadernykh
issl., 1962. 31 p.   (MIRA 15:10)
   (Mesons—Scattering) (Nucleons—Scattering)
                   (Perturbation)

CHERNIKOV, N.A.

The Fock representation of the Duffin-Kemmer algebra. Acta physica Pol 21 no.1:51-60 '62

1. Joint Institute for Nuclear Research, Laboratory of Theoretical Physics, Dubna, U.S.S.R.

AUTHORS: Logunov, A. A., Todorov, I. T., Chernikov, N. A.

TITLE: . Generalization of Symanzik's theorem on majorization of
             Feynman graphs

PERIODICAL: Zhurnal eksperimental'noy i teoreticheskoy fiziki, v. 42,
             no. 5, 1962, 1285-1293

TEXT: In an earlier paper (DAN SSSR 135, 801, 1960) the authors showed
that a majorization method developed by them made it possible to reduce
the consideration of all strongly connected Feynman graphs of one process
to that of a finite number of graphs. Such a graph may be considered to
be strongly connected, if, upon one of the internal lines being broken,
it does not become dissociated, the square of the outer momenta being
regarded as independently variable. The set of classes R_0 of all diagrams
is sought in a maximum enclosed Euclidean area of outer momenta wherein
the Feynman integral does not display any singularities. For NN
scattering $R_0 = 7$, for the meson-meson scattering $R_0 = 3$, and for the meson-
nucleon scattering $R_0 = 14$. The method of determining class R_0 is discussed
Card 1/8

Generalization of Symanzik's ...

at length. For the purpose of comparing the diagrams of class R_0 a
detailed examination is made of the quadratic form of general Feynman
graphs and an explicit expression for this form is arrived at terms of the
identity matrix. This matrix with n rows and l columns then forms the
main characteristic of any graph having n nodes and l internal lines. An
expression is also derived for the conjugated (inverse) quadratic form.
Further, the minimum expressions are obtained for the Feynman parameters
(α) relating to the conjugated quadratic form and finally the results are
transferred to the Symanzik theorem of graph majorization, which is
thereby proved. The generalization of this theorem is discussed. The
results following from the particular and the generalized Symanzik theorem
are discussed for the special case of a NN scattering. It can be shown
that the set R_0 of the graphs for the NN scattering are majorized by the
two former (I, II, Fig. 1). All strongly connected graphs of the meson-
nucleon scattering can be majorized by the sum of the four graphs in Fig. 2.
There are two figures.

ASSOCIATION: Ob"yedinennyy institut yadernykh issledovaniy (Joint Insti-
              tute of Nuclear Research)
SUBMITTED: December 9, 1961
Card 2/@

24,5300

S/020/62/144/001/012/024
B104/B102

AUTHOR: Chernikov, N. A.

TITLE: Kinetic equation of a relativistic gas in an arbitrary
             gravitational field

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 144, no. 1, 1962, 89-92

TEXT: The kinetic equation for an ideal gas in an arbitrary Einstein
gravitational field is derived by methods suggested by the author in
previous papers (DAN, 112, no. 6, 1030 (1957); 114, no. 3, 530 (1957);
Nauchn. dokl. vyssh. shkoly, fiz.-matem. nauki, no. 1, 168 (1959)).
It is obtained in a way similar to the derivation of the Boltzmann
equation in the nonrelativistic case. Academician V. A. Fok is thanked
for discussions.

ASSOCIATION: Ob"yedinennyy institut yadernykh issledovaniy
              (Joint Institute of Nuclear Research)

Card 1/2

24.6713

S/020/62/144/002/010/028
B104/B102

AUTHOR: Chernikov, N. A.

TITLE: Flow vector and mass tensor of a relativistic ideal gas

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 144, no. 2, 1962, 314-317

TEXT: In a previous work[*](DAN, 144, no. 1 (1962)), the author had
derived the kinetic equation of a relativistic ideal gas of n components
in any Einstein field of gravitation. The same denotations are used here
to express the flow vector and the mass tensor by the distribution

function of the gas. The tensor $T_i^{\alpha\beta}(x) = \int_{\pi_i} p^\alpha p^\beta A_i(x,P)dP$, where $A_i(x,P)$

is the distribution function of the i-th component, possesses all the
properties of the mass tensor of a closed conservative system if the
distribution function satisfies the kinetic equation. Academician
V. A. Fok is thanked for a discussion.

Card 1/2 * S/020/62/144/001/012/024

Flow vector and mass tensor of a ...   S/020/62/144/002/010/028
                                            B104/B102

ASSOCIATION: Ob'yedinennyy institut yadernykh issledovaniy
              (Joint Institute of Nuclear Research)

PRESENTED: December 11, 1961, by V. A. Fok, Academician

SUBMITTED: November 9, 1961

Card 2/2

AUTHOR: Chernikov, N. A.

TITLE: Relativistic Maxwell-Boltzmann distribution and integral
            form of the laws of conservation

PERIODICAL: Akademiya nauk SSSR. Doklady, v. 144, no. 3, 1962, 544-547

TEXT: The general form of the Einstein metric tensor assuming
relativistic Maxwell-Boltzmann distribution of the ideal gas is derived.
It is demonstrated that such a distribution is possible only in a
stationary gravitational field if the gas involves particles with
nonvanishing rest mass. If the gas consists only of zero rest mass
particles, less stringent conditions will be imposed on the gravitational
field. In this case a Maxwell-Boltzmann distribution is possible only
when the Einstein metric tensor differs from the stationary tensor by an
arbitrary scalar factor (which may also be unity). A close connection
between the Maxwell-Boltzmann distribution and the integral form of the
laws of conservation has been established. New integral laws of conserva-
tion are demonstrated for the case in which the invariant trace of the

Card 1/2

Relativistic Maxwell-Boltzmann ...

S/020/62/144/003/015/030
B108/B102

mass tensor vanishes.

ASSOCIATION: Ob"yedinennyy institut yadernykh issledovaniy (Joint
              Institute of Nuclear Research)

PRESENTED: December 11, 1961, by V. A. Fok, Academician

SUBMITTED: November 9, 1961

Card 2/2

CHERNIKOV, N.A.; SARANTSEVA, V.R., tekhn. red.

[Derivation of relativistic hydrodynamic equations from the relativistic kinetic equation] Vyvod uravnenii reliativistkoi gidrodinamiki iz reliativistskogo kineticheskogo uravneniia. Dubna, Ob"edinennyi in-t iadernykh issledovanii, 1963. 6 p.

(Hydrodynamics)   (Mechanics)   (MIRA 16:6)

CHERNIKOV, N.A.; SARANTSEVA, V.R., tekhn. red.

[Microscopic foundations of relativistic hydrodynamics]
Mikroskopicheskoe obosnovanie reliativistskoi gidrodina-
miki. Dubna, Ob"edinennyi in-t iadernykh issledovanii,
1963. 25 p.
    (Hydrodynamics)   (Relativity (Physics)) (MIRA 16:6)

LOGUNOV, A.A. (Dubna); LYU I-CHEN' [Liu I-ch'ên] (Dubna); TODOROV, I.T. (Dubna); CHERNIKOV, N.A. (Dubna)

Dispersion relations and analytic properties of partial amplitudes in perturbation theory. Ukr. mat. zhur. 15 no.3: 250-276 '63.

(MIRA 16:12)

LOGUNOV, A/A.; LIU I -CEN; [Liu I-ch'ên]; TODOROV, I.T,; CERNIKOV, N.A.

.Dispersion relations and the analytic properties of partial
amplitudes in the pertubation theory. Analele mat 17 no.4:82-
112 O-D '63.

L 14371-63   EWT(1)/FCC(w)/BDS   AFFTC/ASD   IJP(C)

ACCESSION NR: AP3001822   P/0045/63/023/005/0629/0645

AUTHOR: Chernikov, N. A.   53

TITLE: The relativistic gas in the gravitational field   52

SOURCE: Acta physica polonica, v. 23, no. 5, 1963, 629-645

TOPIC TAGS: relativistic gas, gravitational field, three-dimensional velocity-space, Einstein gravitational phenomenon, Boltzmann kinetic equation, energy-momentum conservation, Lobachevsky space, relativistic Boltzmann equation, matter conservation

ABSTRACT: The Boltzmann kinetic equation is established for the rarefied relativistic gas in the gravitational field with smallest restrictions on the topological structure of the space-time manifold. The equation of change of molecular properties is obtained. It is proved that the divergences of the numerical flux vector and the energy-momentum tensor equal zero; also that the divergence of the flux vector of the entropy is nonnegative (H-theorem). The principle of detailed balancing for the relativistic gas in the equilibrium state is considered.

Card 1/2 /   Association: Joint Inst. for Nuclear Research, Laboratory of Theoretical Physics, Dubna

BUBELEV, E.G.; CHERNIKOV, N.A.

Graphic method in the kinematics of a reaction with a participating
photon. Acta physica Pol 26 no.1:155-161 Jl '64.

1. Joint Institute of Nuclear Research, Laboratory of High
Energies Laboratory of Theoretical Physics, Dubna, U.S.S.R.

CHERNIKOV, N.A.

Equilibrium distribution of the relativistic gas. Acta physica
Pol 26 no.6:1069-1092 '64.

1. Joint Institute for Nuclear Research, Laboratory of Theoretical
Physics, Dubna, SSSR. Submitted April 8, 1964.

TAGIROV, E.; CHERNIKOV, N.A.

Commutative function of the scalar field in a two-dimensional
pseudo-riemannian space - time model. Dokl. AN SSSR 160 no.5:
1049-1052 F '65.   (MIRA 18:2)

1. Ob"yedinennyy institut yadernykh issledovaniy. Submitted
September 14, 1964.

L 34804-66   EWT(1)

ACC NR: AP6018809

SOURCE CODE: UR/0056/66/050/005/1296/1308

AUTHOR: Barbashov, B. M.; Chernikov, N. A.

ORG: Joint Institute of Nuclear Research (Ob"yedinennyy institut yadernykh issledovaniy)

TITLE: Solution and quantization of a nonlinear two-dimensional model for a Born-Infeld type field

SOURCE: Zh eksper i teor fiz, v. 50, no. 5, 1966, 1296-1308

TOPIC TAGS: quantum electrodynamics, Cauchy problem, field theory, space time, HYPERBOLIC EQUATION, EUCLIDEAN SPACE

ABSTRACT: The authors solve the Cauchy problem for the hyperbolic equation

$$(1 - \varphi_t^2)\varphi_{x,x} + 2\varphi_x\varphi_t\varphi_{x,t} - (1 + \varphi_x^2)\varphi_{t,t} = 0,$$

which is a two-dimensional scalar analog of the equations of the Born-Infeld non-linear electrodynamics of the free field. By regarding this equation as the equation for the extremal surfaces in pseudo-euclidean space, it becomes possible to generalize the problem to a case which is easier to solve, that of a two-dimensional extremal surface in N-dimensional pseudo-euclidian space. From the physical point of view this is equivalent to generalizing the nonlinear Born-Infeld field to the case of fields interacting in some prescribed manner. In the obtained solution the time and the coordinate, together with the field functions, are interpreted as components of a new multi-component field. This interpretation leads to a procedure for quantizing

Card 1/2

L 34304-66

ACC NR: AP6018809

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such linear systems without recourse to perturbation theory. As a result of the quantization, the time and the coordinate turn out to be operators along with the field functions. The result is a theory in quantized space-time. The authors thank D. I. Blokhintsev and N. N. Bogolyubov for interesting discussions. Orig. art. has: 59 formulas.

[02]

SUB CODE: 20,12/ SUBM DATE: 12Nov65/   ORIG REF: 007/   OTH REF: 001
ATD PRESS: 5630

Card 2/2 92

CHERNIKOV, N.V.

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E030/E135

ll 0100
AUTHORS: Maslyanskiy, G.N., Bursian, N.P., Kamusher, G.D.,
Potapova, A.A., Garanin, I.L., and Chernikov, N.V.

TITLE: Some technological points in catalytic reforming.

PERIODICAL: Khimiya i tekhnologiya topliv i masel, 1961, No.8,
pp. 1-8

TEXT: Some very important principles in reforming have been
established at a pilot plant specially constructed by Lengiprogaz
on the basis of data supplied by VNIIneftekhim, and operated over
six years. Since the reforming process is highly endothermic,
laboratory conditions, which are approximately isothermal, cannot
adequately simulate the adiabatic plant-scale conditions.   The
pilot plant is conventional, with three successive identical
reactors, 160 mm diameter and 3100 mm high. Feed can enter at
20 to 50 atmospheres, and the reactors are maintained at 500-525°C.
The first three experiments, lasting six months each, used Eastern
crudes with about 25% naphthenes and no catalyst regeneration;
the fourth used Il'skiy crude, with about 40-50% naphthenes and
oxidative regeneration. In the first experiments, the reactor
Card 1/ 3

Some technological points in ...

26518
S/065/61/000/008/001/009
E030/E135

temperature was slowly increased to compensate for the decreasing catalyst activity (Pt catalyst). The Eastern crudes with 0.15% sulphur feed gave benzine with 72 ON (Motor method) but the fourth experiment, with hydrofined material, gave 78 ON. Adiabatically controlled experiments established the activation energies as around 75 kcal/kg. As the asphaltene content rose, the heating effect also rose sharply; it also rose as the sulphur content fell and destructive hydrogenation increased. The temperature drops in the reactors indicated that, for the Eastern crudes, the reaction of aromatization was virtually completed in the second reactor, but this disagreed with the product analysis from the reactors which gave the production of aromatics from stage to stage as about 50, 35 and 15%. Clearly, reaction continued in the last stage, but heat absorption was masked by the increasing exothermic hydrocracking in the third reactor. In the last series of experiments the temperature was probed through each catalyst bed. It was seen that with fresh catalyst and Eastern crudes with 0.15% sulphur, only about 50% of the first stage showed temperature gradients, and the whole of the second stage showed a gradual temperature gradient; one might therefore wish to reduce the charge
Card 2/3

Some technological points in ....

26518
S/065/61/000/008/001/009
E030/E135

in the first reactor, for economy.   However, with catalyst ageing, the temperature drop began to be very shallow in about the first 10% of all three reactors, and there were distinct gradients in them all.   This showed that the first stage was acting also as a trap for catalyst "poisons", and a large charge was therefore necessary, unless one wished to previously remove the poisons (such as nitrogen, sulphur, and arsenic) by hydrofining, for example.
All the results of the investigation concerned fundamental principles which could not have been resolved in laboratory scale experiments.
There are 3 figures and 5 tables.

ASSOCIATION: VNIIneftekhim

Card 3/3

MASLYANSKIY, G.N.; BURSIAN, N.R.; KAMUSHER, G.D.; POTAPOVA, A.A.;
GARANIN, I.L.; CHERNIKOV, N.V.

Certain problems involved in the technology of catalytic
reforming processes. Khim.i tekh.topl.i masel 6 no.8:1-8
Ag '61.   (MIRA 14:8)

1. Vsesoyuznyy nauchno-issledovatel'skiy institut neftekhimi-
cheskikh protsessov.
                    (Cracking process)

ACCESSION NR: AP5011689   EPF(c)/EWT(m)/T/EWP(b)/EWP(t)   IJP(c)   DJ/JD

I 44179-65

Card

3(8)

AUTHOR: Chernikov, O. A.

TITLE:

SOV/20-122-5-45/56

Epigenetic Epidote and Zoisite in the Lower Carboniferous Beds of the Eastern Slope of the Urals (Ob epigeneticheskikh novoobrazovaniyakh epidota i tsoizite v nizhnekamennougol'nykh otlozheniyakh Vostochnogo sklona Urala)

PERIODICAL: Doklady Akademii nauk SSSR, 1958, Vol 122, Nr 5, pp 909-911 (USSR)

ABSTRACT: Today prime importance is assigned to the problem of secondary mineral formation. The study of these processes determins mineralogical changes which have taken place over a long period of geologic time; this has great scientific and practical significance. The author studied the lithology of carbon-rich units of the eastern slope of the Urals in order to find favorable oil producing strata of the Lower Carboniferous. During this work he made special note of the epigenetic processes. These processes strongly influence the porosity of the sand-stone, usually decreasing its collecting abilities. Formation of epigenetic epidote was observed by the author in sandy "Aleurite" rocks of Miass River (Village Bol'shoye Bolandino)

Card 1/4

Epigenetic Epidote and Zoisite in the Lower Carboniferous Beds of the
Eastern Slope of the Urals   SOV/20-122-5-45/56

region. The clastic part of the rock is primarily composed of
broken plagioclase and rare orthoclase grains. Two varieties
of secondary epidote occur: a) figure 1 A,B, b) figure 1 V,G.
with the epidote are small rhombohedral zoisite crystals which
have an abnormal indigo-blue tinge. Also present are segrega-
tions of autigenic irregular albite crystals. In similar rocks
of the carbonaceous strata far smaller amounts of clastic
feldspar are present (up to 6-8 across from Bolandino) and in
these rocks no autigenic epidote and zoisite were found. This
sparcity of autigenic mineral formation is not accidental and
suggests an origin which is apparently analogous to the trans-
formation of feldspar rocks into epidote (Ref 1). The anorthite
component of the feldspar if at all present is transformed into
epidote on the arrival of Ca, Fe_2O_5, and H_2O, while the albite
component remains intact and is segregated as albite crystals.
Thus the general occurrence of newly formed epidote and auti-
genic albite is understandable as many earlier authors have
mentioned. Zoisite forms when the amount of the other epidote

Card 2/:

Epigenetic Epidote and Zoisite in the Lower Carboniferous Beds of the   SOV/20-122-3-45/56
Eastern Slope of the Urals

components exceeds that of iron. The formation of epidote
group minerals cannot be caused by postmagmatic, hydrothermal
processes or by weathering processes. It follows that the
formation of epidote as described is to be considered epi-
genetic. Their formation is connected with mineralogic com-
position of clastic component of sandy "aleurite" rocks, which
are represented by plagioclase. There are 1 figure and 2
Soviet references.

ASSOCIATION: Institut nefti (Akademii nauk SSSR (Petroleum Institute of the
                 Academy of Sciences USSR)

PRESENTED: May 29, 1958, by N. M. Strakhov, Academician

SUBMITTED: May 27, 1958

Card 3/4

CHERNIKOV, O.A., Cand Geol Min Sci -- (diss) "Lithology of the lower coal ~~deposits~~ with ~~s~~ of the southwest frame of the Western Siberian ~~Plain~~ lowlands." Nos, 1959, 14 pp (Acad Sci USSR. Inst of Geology and Mining of Combustible Minerals. Laboratory of Lithology and Stratigraphy of Petroleum and Gas-~~Bearing~~ Regions) 150 copies (KL, 34-59, 112)

- 28 -

CHERNIKOV, O.A.

Secondary alterations of sedimentary rocks. Lit. i pol.
iskop. no.1:135-138 '63.
(MIRA 17:3)

1. Institut geologii i razrabotki goryuchikh iskopayemykh.

CHERNIKOV, O.A.

Some authigenic new formations in lower Carboniferous sandy siltstones of the Asha trough (northwestern Kazakhstan). Dokl. AN SSSR 135 no.4:958-960 '60.   (MIRA 13:11)

1. Institut geologii i razrabotki goryuchikh iskopayemykh Akademii nauk SSSR. Predstavleno akademikom N.M.Strakhovym.
        (Asha region (Kazakhstan)--Petrology)